BASEMENT

working paper
department
of economics

MASS. INST. TECH.
MAR 5 1978
DEWEY LIBRARY

INTEREST ARBITRATION, OUTCOMES, AND THE INCENTIVE TO BARGAIN: THE ROLE OF RISK PREFERENCES

Henry S. Farber and Harry C. Katz*

No. 212 November 1977

massachusetts
institute of
technology

50 memorial drive
cambridge, mass. 02139

INTEREST ARBITRATION, OUTCOMES, AND THE INCENTIVE TO BARGAIN: THE ROLE OF RISK PREFERENCES

Henry S. Farber and Harry C. Katz*

No. 212 November 1977

*The authors are Assistant Professors of Economics. This is a preliminary draft. Please do not quote. Comments are welcome.


Digitized by the Internet Archive
in 2011 with funding from
Boston Library Consortium Member Libraries

http://www.archive.org/details/interestarbitrat00farb

I. Introduction

Traditionally, disputes between unions and employers over the terms of employment have been settled by agreement through collective bargaining. Failing such an agreement a strike, which imposes costs on both parties, has been the weapon of last resort. The threat of such a strike acts as an incentive for the parties to reach a bargained settlement. More formally it creates a "contract zone" or a range of potential settlements which both parties prefer to the strike outcome.

The recent increase in public sector unionization has sparked efforts to devise procedures for settling labor disputes in this area without resort to the strike. Binding third party intervention in the form of interest arbitration is one alternative that has been utilized in a number of jurisdictions.[1] Interest arbitration is defined here as a procedure whereby, failing a negotiated settlement, the parties abide by the decision of a third party as to the terms of employment under dispute.

Two criteria have frequently been used to evaluate interest arbitration and other dispute settlement procedures. The first is the frequency with which it is necessary to employ the procedure. For reasons which are not entirely clear it is felt that a good procedure is one which is "seldom" used and provides an incentive for the parties to reach a negotiated settlement. As with the strike, the presence of an arbitration procedure theoretically provides the parties with an incentive to reach a negotiated settlement by creating a contract zone within which any settlement is preferred by both parties to arbitration. It is shown below that the ability of an arbitration procedure to create such a contract zone depends on the relative risk preferences of the parties.

The second criterion used to evaluate dispute settlement procedures is the extent to which the presence of the procedure creates an environment

in which the bargained as well as the arbitrated settlements do not differ significantly from the settlements that the parties would have reached in an environment that did not include the procedure. The implication is that a good procedure is one whose presence does not bias the outcomes. It is demonstrated below that unbiasedness depends on the relative risk preferences of the parties and, in addition, on their relative bargaining powers.

Section II contains the development of a model of bargaining in the presence of a binding dispute settlement procedure. It is used to examine the conditions under which the procedure encourages a negotiated settlement by creating a contract zone.

There has been a feeling that interest arbitration of the type defined earlier has failed to provide sufficient incentive for a negotiated settlement.[2] Final-offer arbitration has been suggested as a feasible alternative to simple arbitration, and a number of states have implemented final-offer arbitration statutes for certain classes of government employees.[3] Section III contains a discussion of the impact of such a change in the arbitration procedure on the incentive to reach a bargained settlement as well as the position of any such settlement.

Finally, Section IV contains a summary of the results and the implications which may be drawn from the analysis concerning both the design and the evaluation of dispute settlement procedures.

II. A Model of Bargaining in the Presence of a Binding Third Party Settlement Procedure

Strikes create a contract zone of potential settlements which are considered by both parties to be pareto superior to the strike outcome by imposing the direct costs of foregone income on both parties. Each party is willing to sacrifice some potential gains from a strike in order to not bear the costs of a strike.[4]

Arbitration does not impose any direct costs on the parties. Therefore, a contract zone must be created through a mechanism that is fundamentally different from that of the strike. An implication of most of the literature in this area is that the leverage of arbitration is derived from the uncertainty perceived by the parties regarding the behavior of the arbitrator. As a result the parties are willing to give up some of the expected gains from an arbitrated settlement in order to avoid the attendent uncertainty. It is our contention that this phenomena depends crucially on the risk preferences of the parties.

The model which is constructed below makes a number of assumptions concerning the bargaining process, the utility functions of the parties, and the behavior of the arbitrator. These are all made in order to clarify the exposition, and relaxation of these assumptions would not in any way alter the nature of the conclusions.

First, it is assumed that there is a homogeneous "pie" of fixed size and that the parties bargain over the division of the pie. Let the pie be of size one so that the share of each party can be represented by a number between zero and one. Let y_a represent the share of party a and $z_b = 1-y_a$ represent the share of party b.

Second, let each party have a utility function

$$U_a = U_a(y_a) \tag{1}$$

and

$$U_b = U_b(z_b) \tag{2}$$

Further, let $U_a(0) = 0$, $U_b(0) = 0$, $U_a(1) = 1$, and $U_b(1) = 1$.[5] Assuming positive marginal utilities, it is clear that the utilities of the parties are in direct opposition to one another and that the gain of one party is the loss of the other.

Parameterizations of the utility functions which satisfy the above constraints are

$$U_a = \frac{1-e^{y_a c_a}}{1-e^{c_a}} \tag{3}$$

and

$$U_b = \frac{1-e^{z_b c_b}}{1-e^{c_b}} \tag{4}$$

These are convenient functional forms because, regardless of the values of c_a or c_b, they always exhibit positive marginal utility and because the risk preferences of the parties are completely determined by c_a and c_b. Party a is risk averse, risk neutral, or risk loving as c_a is less than, equal to, or greater than zero.[6] The analogous conditions determine the risk preferences of party b.

Assume further that the arbitrator's role is to choose a y_{aA} which of course determines $z_{bA} = (1-y_{aA})$ where y_{aA} represents the arbitrator's award to party a. Neither party knows with certainty what the arbitrated settlement will be. It is assumed that each party forms a prior distribution of the arbitrator's decision and that these prior distributions are

$$y_{aA} \sim N(y_{aF}, \sigma_a^2) \tag{5}$$

$$z_{bA} \sim N(z_{bF}, \sigma_b^2) \tag{6}$$

where y_{aF} and z_{bF} are the arbitration awards expected by each party should the procedure be utilized. These may be determined by some notion of a "fair" settlement, and they may or may not be equal.[7] σ_a^2 and σ_b^2 represent the expected variances of the awards around y_{aF} and z_{bF}.[8]

Given these prior distributions each party calculates the expected utility to them of using the arbitration procedure:

$$E(U_a) = \int_{-\infty}^{\infty} \frac{1-e^{y_a c_a}}{1-e^{c_a}} f(y_a;\ y_{aF},\ \sigma_a{}^2)dy_a \qquad (7)$$

and

$$E(U_b) = \int_{-\infty}^{\infty} \frac{1-e^{z_b c_b}}{1-e^{c_b}} f(z_b;\ z_{bF},\ \sigma_b{}^2)dz_b \qquad (8)$$

where $f(y_a;\ y_{aF},\ \sigma_a{}^2)$ and $f(z_b;\ z_{bF},\ \sigma_b{}^2)$ are normal probability density functions defined in equations (5) and (6). Using the definition of a moment generating function for a normal density these integrals have the analytical solutions

$$E(U_a) = \frac{1-e^{(c_a y_{aF} + \frac{1}{2}\sigma_a{}^2 c_a{}^2)}}{1-e^{c_a}} \qquad (9)$$

and

$$E(U_b) = \frac{1-e^{(c_b z_{bF} + \frac{1}{2}\sigma_b{}^2 c_b{}^2)}}{1-e^{c_b}} \ . \qquad (10)$$

These expected utilities are combined with the utility functions in order to solve for the certainty equivalent shares (y_{as} and z_{bs}) which are the y_a and z_b that received with certainty would yield the same utilities as the expected utilities from arbitration.

$$U_{as} = \frac{1-e^{y_{as} c_a}}{1-e^{c_a}} \qquad (11)$$

and

$$U_{bs} = \frac{1-e^{z_{bs} c_b}}{1-e^{c_b}} \ . \qquad (12)$$

Equating equations (9) and (11) and equations (10) and (12) and solving for

y_{as} and y_{bs} yields

$$y_{as} = y_{aF} + \frac{1}{2}\sigma_a{}^2 c_a \tag{13}$$

and

$$z_{bs} = z_{bF} + \frac{1}{2}\sigma_b{}^2 c_b \quad . \tag{14}$$

If the parties are risk averse ($c_a < 0$, $c_b < 0$) then $y_{as} < y_{aF}$ and $z_{bs} < z_{bF}$. Intuitively the parties would be willing to settle with certainty for less than the expected arbitration award. This sacrifice is essentially a payment to avoid the disutility of the risk of arbitration. Alternatively, if the parties are risk lovers ($c_a > 0$, $c_b > 0$) then $y_{as} > y_{aF}$ and $z_{bs} > z_{bF}$ and the parties must be paid a premium in order to be discouraged from "enjoying" the risk of the arbitration process.

Assuming that the parties are expected utility maximizers, party a would prefer to negotiate any settlement $y_a > y_{as}$ rather than resort to arbitration while party b would prefer to negotiate any settlement $z_b > z_{bs}$ rather than resort to arbitration. In order to determine if there is a zone of potential agreement, note that if z_{bs} is the minimum share for b that will cause b to prefer a negotiated settlement then $1-z_{bs} = y_{bs}$ is the maximum share that b would be willing to give a and still prefer a negotiated settlement. From equation (14)

$$y_{bs} = 1-z_{bs} = 1-z_{bF} - \frac{1}{2}\sigma_b{}^2 c_b \tag{15}$$

or

$$y_{bs} = y_{bF} - \frac{1}{2}\sigma_b{}^2 c_b \tag{16}$$

where y_{bF} is party b's prior expectation of the arbitrators decision of a's share.

Thus, a will accept any negotiated settlement (y_n) satisfying $y_n > y_{as}$ and b will accept any negotiated settlement satisfying $y_n < y_{bs}$. Thus, the contract zone or range of potential settlements is

$$\Delta = y_{bs} - y_{as} = y_{bF} - y_{aF} - \frac{1}{2}(\sigma_a^2 c_a + \sigma_b^2 c_b). \quad (17)$$

If Δ is less than or equal to zero then there is no contract zone and the arbitration procedure will be used.[9] The question of where in any existing contract zone the parties actually negotiate a settlement is discussed in the next section.

It is clear from equation (17) that the contract zone will be larger the larger is the difference between y_{bF} and y_{aF}. In other words, if the parties have relatively pessimistic expectations about the arbitrator's award then there may be room for a negotiated settlement. On the other hand, if the parties have relatively optimistic expectations about the behavior of the arbitrator then this will tend to discourage a negotiated settlement by reducing the contract zone.

While there is no reason to assume that the parties' expectations vary in any systematic fashion, it may be true that when a procedure is first introduced the parties have differing and inaccurate expectations about the arbitrator's behavior. If this difference is relatively pessimistic (optimistic) then the procedure will be invoked less (more) frequently than it would given accurate expectations.

This observation has important implications for attempts to evaluate the impact of any procedure or any change in procedure. To the extent that the parties learn about the arbitrator's behavior and modify their expectations, the rate of utilization of a new procedure in the short run will not be

indicative of its long run impact on the incentive to reach a bargained settlement. Thus, an evaluation of a procedure after only one, two, or even three years may be extremely misleading.

The long run impact of a procedure will depend primarily on the relative risk preferences of the parties. In order to focus on this aspect of the problem assume that the parties have identical expectations about the arbitrator's behavior or that $y_{aF} = y_{bF}$ and $\sigma_a^2 = \sigma_b^2 = \sigma^2$. Equation (17) can be rewritten as

$$\Delta = -\frac{1}{2}\sigma^2[c_a + c_b]. \tag{18}$$

Recall that $c_a < 0$ and $c_b < 0$ imply risk aversion on the part of a and b respectively. If both parties are risk averse then $c_a + c_b < 0$ which implies that $\Delta > 0$, i.e. that there is a contract zone.

The weaker condition for the existence of a contract zone given identical expectations is that risk aversion dominate ($c_a + c_b < 0$). It is not necessary that both parties be risk averse but only that the party which is most risk averse be in a sense more averse to risk than the extent to which the other party loves risk.

In the simple world described above the parties have identical expectations and, consequently, the utilization decision is completely determined by the relative risk preferences. Although identical expectations may be rare, it is reasonable to conclude that the relative risk preferences of the parties are an important determinant of the size of any contract zone and that short run differences in expectations concerning the arbitrator's decision serve to modify the potential contract zone implied by the relative risk preferences of the parties.

It was demonstrated above that the relative risk preferences of the parties are crucial to the ability of an arbitration procedure to create a contract zone. For the procedure to be effective in the long run, risk

aversion must dominate. What are the risk preferences of unions and management? There is almost a total absence of empirical evidence concerning the risk preferences of the parties in a collective bargaining situation. In the private sector, neoclassical economists generally assume that firms are profit maximizers and hence risk neutral. On the other hand, in a recent study of the preferences of union members as reflected in the wage policy of the United Mine Workers a significant degree of risk aversion was found.[10] If these findings are representative then it seems reasonable to assert that risk aversion dominates in the private sector.

In the public sector, which is the primary locus of interest arbitration procedures, there is no generally accepted objective function for the employer. While not crucial to the earlier argument, some tentative notions on the relative risk preferences of unions and employers in the public sector can be developed. First, there is no reason, a priori, to expect that unions in the public sector will exhibit risk preferences that are significantly different from those of private sector unions. It is expected that unions will be quite risk averse because they are dealing with the primary source of income of their members, and the penalties for losing the members' primary income source are liable to be severe.

Second and for similar reasons, the public sector employer is expected to exhibit less risk aversion than the union. The reason for this is the fact that wages, while important, are not the only expense of the government unit and that the taxes which finance wages account for only a small share of the expenses of the citizenry.

It is possible that the employer will be a risk lover if adverse arbitrator rulings can be blamed on the "imposed" settlement while the employer reaps the political benefits of favorable awards. It is not clear

that a union leader can use this device as effectively due to the importance of wage income to the union members.

In the context of the model developed earlier, it is reasonable to assume that the union (party a) is risk averse ($c_a < 0$) and that the public sector employer is less risk averse ($c_b > c_a$). While it seems that the usual situation will be one of risk aversion dominating ($c_a + c_b < 0$), there is no convincing evidence of this. Risk loving behavior by the employer (or, however implausibly, by the union) may imply dominance of risk loving behavior ($c_a + c_b > 0$). This latter situation with identical expectations about arbitrator behavior implies no contract zone, and the result will be complete reliance on the procedure by the parties or a total "chilling" of bargaining.

III. The Implications of a Change in the Procedures

It was noted in the introduction that there has been some concern that conventional arbitration has "chilled" bargaining and that the procedures are being overused. Final-offer arbitration was suggested as an alternative to conventional arbitration that is ". . . well designed to . . . generate(s) just the kind of uncertainty about the location of the arbitration award that is well calculated to . . . compel them (the parties) to seek security in agreement."[11] Thus, final-offer arbitration was conceived as a technique for increasing the uncertainty about the arbitrator's decision. While it is true that final-offer schemes are in some ways fundamentally different from conventional arbitration and that they may not actually increase the uncertainty to the parties, it is useful to examine the impact of such a change in procedures as essentially the result of an increase in uncertainty.[12] This allows us to examine its impact on both the frequency of use of the procedure and the negotiated settlement itself.

It is important to note that any change in the type of procedure available may create temporarily divergent expectations which will have an unpredictable effect on the contract zone. As the parties learn about the new procedure this effect will disappear. Changes in the environment may also cause expectations to diverge in the short run. Hence, during unusual periods such as that which followed the New York City financial crisis atypical rates of usage of arbitration procedures may occur.

Once the parties have identical expectations about the arbitrator's behavior, equation (18) can be used to examine the impact of the change in the procedure on the size of the contract zone (Δ) and hence the frequency of use of the procedure. Taking the derivative of equation (18) with respect to σ^2 yields

$$\frac{\partial \Delta}{\partial \sigma^2} = -\frac{1}{2}(c_a + c_b) \qquad (19)$$

which is greater than or less than zero as risk aversion or risk loving behavior dominates. If the old procedure created a contract zone (risk aversion dominated) then change to a riskier procedure will increase the size of the contract zone making it less likely that fluctuations in the parties' expectations will eliminate the zone and force use of the procedure. This is exactly the situation expected by the proponents of final-offer arbitration. However, because it is not clear, a priori, whether risk aversion or risk loving dominates it is also not clear whether a riskier procedure will cause the size of the contract zone to increase or decrease.[13]

The other criterion, discussed in the introduction, for evaluating the impact of a change in the arbitration procedure is the extent to which the introduction of a new procedure changes the terms of the settlement both where the procedure is used and where it is not used. In order to investigate this problem we develop a naive bargaining theory of the determination of the negotiated settlement.

It is assumed that the relative bargaining powers of the parties are such that a certain proportion (Φ) of the contract zone is always captured by party a.[14] This is true regardless of the size or location of the contract zone. Since the certainty equivalent share of party a (y_{as}) is the lower bound of any positive contract zone, the actual negotiated settlement under the simple bargaining power model is

$$y_n = y_{as} + \Phi \Delta \tag{20}$$

where $0 \leq \Phi \leq 1$. Of course, this only applies where Δ is greater than zero. If Δ is less than zero then there is no contract zone and arbitration is invoked.

Maintaining the assumption of identical expectations about the arbitrator's behavior and substituting from equations (13) and (18) into equation (20) for y_{as} and Δ yields

$$y_n = y_F + \frac{1}{2}\sigma^2 c_a - \Phi \frac{1}{2}\sigma^2 (c_a + c_b) \tag{21}$$

or

$$y_n = y_F + \frac{1}{2}\sigma^2 [(1-\Phi)c_a - \Phi c_b]. \tag{22}$$

If party a has all of the bargaining power (Φ=1) then $y_n = y_F - \frac{1}{2}\sigma^2 c_b$ which is simply party b's certainty equivalent maximum share (y_{bs}) for party a.[15] If party b has all of the bargaining power (Φ=0) then $y_n = y_F + \frac{1}{2}\sigma^2 c_a$ which is simply party a's certainty equivalent minimum share (y_{as}). In general Φ will not take on either of these extreme values but will lie somewhere between zero and one.

Even in cases where it is not used a change in the procedure can have an effect on the location of the outcome in two ways. First, the new

procedure may bias or change the expected arbitration decision (y_F) in the long run. It is clear from equation (21) that this bias will be passed through on a one for one basis to the settlement.

It is of course true that the original arbitration procedure may have biased the negotiated settlements relative to what they would have been had no procedure been available. The question of biases from both of these sources is strictly an empirical issue that should be investigated.

A second way in which a change in the type of procedure can affect the location of the outcome is through a change in the uncertainty about the arbitrators award (σ^2). Differentiation of y_n in equation (22) with respect to σ^2 yields

$$\frac{\partial y_n}{\partial \sigma^2} = \frac{1}{2}[(1-\Phi)c_a - \Phi c_b]. \tag{23}$$

The sign of this expression is indeterminant and depends on the relative risk preferences as well as the relative bargaining powers of the parties. Given that risk aversion dominates ($(c_a + c_b) < 0$, the necessary and sufficient condition for an increase in uncertainty to increase y_n ($\frac{\partial y_n}{\partial \sigma^2} > 0$) is that

$$\Phi > \frac{c_a}{c_a + c_b}. \tag{24}$$

While Φ measures the relative bargaining power of party a, $\frac{c_a}{c_a+c_b}$ measures the risk aversion of party a relative to the total risk aversion of the two parties. Intuitively, equation (24) has the implication that the share of party a will increase with an increase in the riskiness of the procedure if the relative bargaining power of party a is high enough to offset party a's risk aversion.

The most important conclusion that can be drawn from this portion of the analysis is that an increase in the uncertainty surrounding the arbitrator's award will not bias the outcomes of negotiated settlements ($\frac{\partial y}{\partial \sigma^2} = 0$) only if

equation (24) holds with equality, i.e.

$$\Phi = \frac{c_a}{c_a + c_b}. \tag{25}$$

There is no reason why this should be true, and it will only be the merest coincidence that it is in fact true. Thus, it can be concluded that in general a change in the arbitration procedure which makes it more risky will bias the outcomes of the negotiated settlements. The direction of the bias depends on the relationship between the bargaining power of the parties and the relative risk preferences of the parties.

The discussion in Section II suggested that there are reasons to expect that the union is more risk averse than the public sector employer. Assume for expository purposes that the union is "twice" as risk averse as the employer and that party a is the union. In other words, $c_a = 2c_b < 0$. Substitution into equation (25) yields the result that the bargaining power of the union must be such that it captures exactly two-thirds of the contract zone ($\Phi=\frac{2}{3}$) in order that a change in the risk of the procedure not bias the outcomes of negotiated settlements. If $\Phi > \frac{2}{3}$ then $\frac{\partial y_n}{\partial \sigma^2} > 0$ and the union will gain by a riskier procedure.[16] Obviously, if the bargaining powers are equal ($\Phi=\frac{1}{2}$) then the union will lose because it is the more risk averse.[17]

To summarize, the change to an arbitration procedure which involves more uncertainty will increase the size of the contract zone as long as risk aversion dominates. This implies a higher probability of achieving a negotiated settlement. However, unless by chance the difference in risk preferences between the parties is <u>exactly</u> offset by the relative bargaining power of the most risk averse party the outcome of negotiated settlements will be biased by the change in the procedure.

IV. Summary and Implications

In this study a model of the use of arbitration procedures and the outcomes of negotiated settlements in the presence of arbitration procedures was developed. It was found that uncertainty about the arbitration award will create a range of potential negotiated settlements only if risk aversion dominates the preferences of the parties.

The impact of alternative arbitration schemes which purport to increase the uncertainty about the arbitration award (such as final-offer arbitration) was also investigated. It was found that if risk aversion dominates then increased risk will increase the size of the contract zone. However, increased risk will almost always bias the outcomes of the negotiated settlements in a way which depends on the relative bargaining powers and risk preferences of the parties.

This study has important implications for both the design and evaluation of binding impasse procedures. First, the designers of any procedure which attempts to create a contract zone through increased uncertainty should consider the fact that such a procedure will almost always bias negotiated outcomes. This is a difficult problem because of the absence of any normative guidelines about what constitutes a desirable outcome.

A second and obvious implication is that since increased uncertainty is the important feature of a new procedure such as final-offer arbitration, designers of such procedures should be sure that their proposed changes do actually increase risk. It is not at all clear that this is the case with final-offer arbitration.[18]

Third, the crucial role of risk preferences on the effects of the arbitration procedures strongly suggests that serious empirical investigation

of the relative risk preferences of the parties be undertaken. Along this same line, empirical analyses of relative arbitrated outcomes under the different systems would be useful because any differences will spill over into the negotiated settlements.

Finally, note that because of initial differences in expectations about the behavior of the arbitrators and because it may take time to learn about the behavior of the arbitrators, studies which attempt to measure the long run impact of changes in procedures shortly after they are instituted are bound to be misleading.

FOOTNOTES

[1]States utilizing binding arbitration procedures in the public sector include Alaska, Connecticut, Iowa, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New York, Oregon, Pennsylvania, Rhode Island, South Dakota, Washington, Wisconsin, and Wyoming. U.S. Department of Labor (1976).

[2]The so called "chilling" effect of arbitration is discussed by Feuille (1975) and Wellington and Winter (1971).

[3]In 1976 certain classes of public employees in Wisconsin; Michigan; Massachusetts; Eugene, Oregon; and Connecticut were covered by final-offer arbitration statutes. U.S. Department of Labor (1976).

Final-offer arbitration is defined here as a procedure whereby the arbitrator chooses one of the final-offers submitted by the parties without any modification. See Stevens (1966).

[4]Hicks argues that " . . . most strikes are doubtless the result of faulty negotiation". Hicks (1963, p. 146). In other words the existence of a contract zone should allow the parties to reach agreement without a strike in most cases.

[5]These assumptions involve linear transformation of an arbitrary utility index. Under certain general conditions such a transformation does not alter the risk behavior of the parties. See Luce and Raiffa (1957, pp. 12-38).

[6]Absolute risk aversion (ARA) of party a is defined as $\frac{-U_a''}{U_a'} = -c_a$. U_a and U_b are undefined for c_a and c_b equal to zero respectively, but by L' Hospital's rule $\lim_{c_a \to 0} U_a(y_a) = y_a$ which is a linear and hence a risk neutral utility

function. The analogous results hold for party b.

[7]Equality is not $y_{aF} = z_{bF}$, but $y_{aF} = 1-z_{bF}$, i.e. identical expectations.

[8]The arbitrator's award must be constrained to the unit interval while the normal distribution implies a nonzero probability of an award outside the unit interval. It is assumed here that σ_a^2 and σ_b^2 are sufficiently small so that the probabilities of an award outside the unit interval are very small. If this is true then use of an unbounded distribution does not seriously alter the results.

[9]All problems of communication are abstracted from, and it is assumed that if there is a contract zone than the parties find it.

[10]See Farber (1977).

[11]Stevens (1966, p. 46).

[12]Two important differences are 1) that the parties themselves have control over the final offers and hence the probabilities of their award being chosen and 2) that there are only two discrete possibilities of an abritrator's award given the final offers. What these complications serve to do is to make it more difficult to determine whether or not final-offer arbitration actually increases uncertainty, but they do not otherwise alter the qualitative implications of the model.

[13]If risk loving dominates ($c_a + c_b > 0$) then a riskier procedure will decrease the probability that fluctuations in expectations will create a positive contract zone.

[14]Relative bargaining power is a complex concept and it is a function of many factors. It is beyond the scope of this paper to discuss it in any detail. Relative bargaining power is in part a function of the relative

bargaining skills, financial positions, and public images of the parties. See Chamberlain (1965, pp. 231-237).

[15]See equation (16).

[16]This may be a partial explanation for the evidence that employee groups have sought legislation enacting final-offer arbitration procedures. Stern (1974, p. 88). Even if unions are the more risk averse party, they may have sufficient bargaining power to more than offset their risk aversion.

[17]If the parties have equal bargaining power then they must be equally risk averse for a change in risk not to affect negotiated outcomes. The converse is also true.

[18]The parties may reduce risk in a final-offer scheme by adjusting their final-offers to affect the probabilities of arbitration awards.

REFERENCES

Chamberlain, Neil W., The Labor Sector, New York: McGraw-Hill, 1965.

Farber, Henry S., "Individual Preferences and Union Wage Determination: The Case of the United Mine Workers", Princeton, New Jersey: Industrial Relations Section, Princeton University, Working Paper No. 99, 1977.

Feuille, Peter, "Final Offer Arbitration and the Chilling Effect", Industrial Relations 14 (October 1975): 302-310.

Hicks, John R., The Theory of Wages, London: MacMillan Press LTD., 1963.

Luce, R. Duncan and Howard Raiffa, Games and Decisions, New York: John Wiley and Sons, Inc., 1957.

Stern, James L., "Private Sector Implications of the Initial Wisconsin Final-Offer Arbitration Experience", in Proceedings of the Twenty-Seventh Annual Meeting National Academy of Arbitrators, 1974.

Stevens, Carl M., "Is Compulsory Arbitration Compatible With Bargaining?", Industrial Relations 5 (February 1966): 38-52.

U.S. Department of Labor, "Summary of Public Sector Labor Relations Policies", Labor-Management Services Administration, Washington, D.C., 1976.

Wellington, Harry H. and Ralph K. Winter, Jr., The Unions and the Cities, Washington, D.C.: The Brookings Institution, 1971.

Date Due

JAN 12 '78

MAR 30 '78

FEB 16 '80

DEC 06 '81

APR 30 1987

APR 3 1997

MAR 07

DEC. 13 1992

Lib-26-67

MIT LIBRARIES
3 9080 004 446 362
MIT LIBRARIES
3 9080 004 415 375
MIT LIBRARIES
3 9080 004 415 383
MIT LIBRARIES
3 9080 004 415 391
MIT LIBRARIES
3 9080 004 415 409
MIT LIBRARIES
3 9080 004 415 417
MIT LIBRARIES
3 9080 004 415 425